HAZARDOUS MATERIALS TRANSPORTATION GUIDES

TRAINING RESOURCES BRANCH (DIIM-51)
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HAZARDOUS MATERIALS DEFINITIONS

The following definitions have been abstracted from the Code of Federal Regulations, Title 49, Transportation, Parts 100-199. Refer to the referenced sections for complete details. Note: In column (1), 49 CRF 172.101, Hazardous Materials Table, the (+) fixes the proper shipping name and hazard class. The name and class do not change whether the material meets or does not meet the definition of that class. (49 CFR 172.101(b)(1))

HAZARDOUS MATERIAL - A substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. (See 49 CFR 171.8)

MULITPLE HAZARDS - A material meeting the definition of more than one hazard class and must be classed according to its position on the list in 49CFR 173.2(a)

For example, a material that meets the definition of a flammable liquid and an irritating material would be classed as a flammable liquid.

DOT HAZARD CLASS	UN CLASS	DEFINITION
EXPLOSIVES		An Explosive in any chemical compound, mixture, or device which is designed to function by explosion, that is substantially instantaneous with the release of gas and heat. Exception--such compound, mixture, or device which is otherwise specifically classified in Parts 171-180. (See 49 CFR 173.50)
CLASS A	1	Detonating. Maximum hazard. The nine types of Class A explosives are defined in 49 CRF 173.53.
CLASS B	1	Flammable hazard. In general, functions by rapid combustion rather than detonation. Included are explosive devices such as special fireworks, flash powders, etc. (49 CFR 173.88)
CLASS C	1	Minimum hazard - Small arms ammunition, certain types of fireworks and various types of manufactured articles containing restricted quantities of Class A and/or Class B explosives as components. Included are common fireworks and various types of small arms ammunition manufactured articles which contain restricted quantities of Class A or Class B explosives. (49 CRF 173.100)
BLASTING AGENT	1	Blasting Agent - A material designed for blasting which has been tested in accordance with 49 CRF 173.114a(b). it must be so insensitive that there is very little probability of: (1) accidental explosion or (2) going from burning to detonation. (49 CRF 173.114a(a))
GASES	2	Compressed Gas - Any material or mixture having in-the-container an absolute pressure exceeding NON-FLAMMABLE GAS 40 psi at 70F, OR a pressure exceeding 104 psi at 130< F; or any liquid flammable material having a vapor pressure exceeding 40 psi at 100< F. (49 CRF 173.300(a))
	2	Non-liquefied Compressed Gas - A gas (other than gas in solution) which, under the charged pressure, is entirely

DOT HAZARD CLASS	UN CLASS	DEFINITION
		gaseous at a temperature of 70< F. (49CFR 173.300))
	2	Liquefied Compressed Gas - A gas which, under the charged pressure, is partially liquid at a temperature of 70< F. (49 CFR 173.300(d))
	2	Compressed Gas in solution - A non-liquefied compressed gas which is dissolved in a solvent. (49 CFR 173.300(e))
	2	Flammable Compressed Gas - Any compressed gas meeting criteria as specified in 49 CFR 173.300(a) and (b). This includes: lower flammability limit, flammability limit range, flame projection, or flame propagation.
	2	Nonflammable Gas - Any compressed gas other than a flammable compressed gas.
FLAMMABLE LIQUID	3	Flammable Liquid - Any liquid having a flash point below 100< F. Authorized methods to determine flashpoints are listed in 49 CFR 173.115(d). For exceptions, see 49 CFR 173.115(a).
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FLAMMABLE LIQUID	3	Pyrophoric Liquid - Any liquid that ignites spontaneously in dry or moist air at or below 130< F (49 CFR 173.115(c))
COMBUSTIBLE LIQUID	3	Combustible Liquid - Any liquid that does not meet any other hazard class, other than ORM-E, having a flash point at or above 100< F and below 200< F. For exceptions, see 49 CFR 173.115(b). Authorized methods to determine flashpoints are listed in 49 CFR 173.115(d). Exceptions are found in 49 CFR 173.118(a).
FLAMMABLE SOLID	4	Flammable Solid - Any solid material (other than an explosive) which under normal transportation conditions is liable to cause fires through friction or retained heat from manufacturing or processing. It can be ignited readily and burns so vigorously and persistently, as to create a serious transportation hazard. Included in this class are spontaneously combustible and water-reactive material. (49 CFR 173.150)
	4	Spontaneously Combustible Material (solid) - A solid substance (including sludges and pastes) which may undergo spontaneous heating or self-ignition under normal transportation conditions. These materials may increase in temperature and ignite when exposed to air. (49 CRF 171.8)
	4	Water Reactive Material (solid) - Any solid substance (including sludges and pastes) which react with water by igniting or giving off dangerous quantities of flammable or toxic gases. (49 CRF 171.8)
ORGANIC PEROXIDE **	5	Organic Peroxide - Any organic compound containing the bivalent -O-O structure. It may be considered a derivative of hydrogen peroxide where one or more of the hydrogen atoms have been replaced by organic radicals. It must be classed as an organic peroxide unless it meets certain criteria listed in 49 CRF 173.151(a)
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OXIDIZER	5	An Oxidizer - A substance such as chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter. (49 CFR 173.151)
POISON A	2	Extremely Dangerous Poisons - Poisonous gases or

DOT HAZARD CLASS	UN CLASS	DEFINITION
		liquids--a very small amount of the gas, or vapor of the liquid, mixed with air is dangerous to life. (49 CFR 173.326)
POISON B	6	Less Dangerous Poisons - Substances, liquid or solid (including pastes and semi-solids), other than Class A Poisons or Irritating materials--so toxic (or presumed to be toxic) to man that they are a hazard to health during transportation. (49 CFR 173.343(a))
IRRITATING MATERIAL	6	An Irritating Material - A liquid or solid substance which, upon contact with fire or air, gives off dangerous or intensely irritating fumes. It does not include any poisonous material, Class A. (49 CFR 173.381)
ETIOLOGIC AGENT	6	An Etiologic agent - A living micro-organism (or its toxin) which causes (or may cause) human disease, and includes those agents listed in 49 CFR 72.3.
RADIOACTIVE MATERIAL	7	Radioactive Material - Any material, or combination or materials, that spontaneously gives off ionizing microcuries per gram. (49 CFR 173.403) (See 49 CFR 173.403(a) through (z) for details.)
CORROSIVE MATERIAL	8	Corrosive Material - A liquid or solid that causes viable destruction or irreversible damage to human skin tissue on contact. Also, it may be a liquid that has a severe corrosion rate on steel. (See 49 CFR 173.240 (A) and (b) for details.
ORM - OTHER REGULATED MATERIALS	9	(1) Any material that may pose an unreasonable risk to health, safety, and property hen transported in commerce; and (2) does not meet any of the definitions of the other hazard classes specified in this subchapter; or (3) has been reclassed an ORM (specifically or permissively) according to this subchapter. (49 CFR 173.500(a))
ORM-A	9	An ORM-A is material which has an anesthetic, irritating, noxious, toxic, or other similar property. If the material leaks during transportation, passengers and crew would experience extreme annoyance and discomfort. (49 CFR 173.500(b)(1))
ORM-B	9	An ORM-B is material, (including a solid when wet with water), the leakage of which could cause significant damage to the vehicle transporting it. Materials meeting one or both of the following criteria are ORM-B materials: (1) specifically designated by name in 49 CRF 172.101 and/or (2) a liquid substance that has a corrosion rate exceeding 0.250 inch per year (1PY) on non-clad aluminum. An acceptable test is described in NACE Standard TM-01-69. (49 CRF 173.500(b)(2))
ORM-C	9	An ORM-C is material which has other inherent characteristics not described as an ORM-A or ORM-B, but which make it unsuitable for shipment, unless properly identified and prepared for transportation. Each ORM-C material is specifically named in 49 CRF 172.101. (49 CRF 173.500(b)(3))
ORM-D	9	An ORM-D is a material such as a consumer commodity, which presents a limited hazard during transportation due to its form, quantity and packaging. It must be a material for which exceptions are provided in ' 172.101. Shipping descriptions applicable to ORM-D materials are found in 49

DOT HAZARD CLASS	UN CLASS	DEFINITION
		CFR 172.101. (49 CRF 173.500(b)(4))
ORM-E	9	An ORM-E is a material that is not included in any other hazard class but is subject to the requirements of this subchapter. Materials in this class include: (1) HAZARDOUS WASTE and (2) HAZARDOUS SUBSTANCES, as defined in 49 CFR 174.8 (49 CRF 173.500(b)(5))

THE FOLLOWING ARE OFFERED TO EXPLAIN SOME OF THE AADDITIONAL TERMS USED IN PREPAERATION OF HAZRDOUS MATERIALS FOR SHIPMENT. (49 CFR 171.8)

DOT TERM	EXPLANATION
CONSUMER COMMODITY	A material that is packaged or distributed in a form intended or suitable for sale through retail sales agencies. The material is for use by individuals for personal care or household use. This term also includes drugs and medicines. (49 CFR 171.8)
FLASH POINT	The minimum temperature at which the flammable vapors of a substance (in contact with a spark or flame) will ignite. For liquids, see 49 CFR 173.115. For solids, see 49 CFR 173.150.
FORBIDDEN	A material that is prohibited from being offered or accepted for transportation. This prohibition does not apply if these materials are diluted, stabilized, or incorporated in devices AND they are classed in accordance with Part 173 of the subchapter. (See 49 CFR 172.101(d)(1)).
HAZARDOUS SUBSTANCE	A material, including its mixtures and solutions, that: (1) is listed in the Appendix to ' 172.101; (2) is in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) listed in the Appendix to 49 CRF 172.101; (3) when in a mixture or solution for radionuclides conform to the appendix to 172.101, Table 2 is in a concentration by weight, which equals or exceeds the concentrations corresponding to the RQ of the material as shown in the table of the "hazardous substance" definition in 49 CFR 171.8. this definition does not apply to petroleum products that are lubricants or fuels. (See 40 CFR 300.6.)
HAZARDOUS WASTE	Any material that is subject to the Hazardous Waste Manifest Requirements of the U.S. Environmental Protection Agency specified in the CFR Title 40, Part 262. For answers to questions regarding EPA hazardous waste regulations, call 1-800-424-9346 in Washington, DC.
LIMITED QUANTITY	The maximum amount of a hazardous material authorized for specific labeling and packaging exceptions. Consult the section applicable to the particular hazard class. See 49 CFR 173.118, 173.118(a), 173.153, 173.244, 173.306, 173.345, and 173.364.

DOT HAZARD CLASS	UN CLASS	DEFINITION

*THIS HANDOUT IS DESINGED AS A TRAINING AID FOR ALL INTERESTED PARTIES WHO MAY BECOME INVOLVED WITH HAZARDOUS MATERIALS. IF DOES NOT RELIEVE PERSONS FROM COMPLYING WITH THE DEPARTMENT OF TRANSOPRTATION'S HAZARDOUS MATERIALS REGULLATRIONS. SPECIFIC CRITERIA FOR HAZARD CLASSES AND RELATED DEFINITIONS ARE FOUND IN THE CODE OF FEDERAL REGULATIONS (CFR, TITLE 49, PARTS 100-199.

GUIDE FOR HAZARDOUS MATERIALS SHIPPING PAPERS

USE OF GUIDE - This Guide is designed for in-house use when reviewing hazardous material shipping paper requirements. However, this document should not be used to determine compliance with the U.S. DOT Hazardous materials Regulations (HMR).

1. DEFINITIONS

A. Shipping Paper - (49 CFR 171.8) A shipping paper is a shipping order, bill of lading, manifest, or other shipping document serving a similar purpose and containing the information required by 49 CFR 172.202, 172.203 and 172.204.

B. Hazardous Wastes Manifest - (40 CFR 262.20) A hazardous waste manifest is a document (shipping paper) on which all hazardous waste is identified. A copy of the manifest must accompany each shipment of waste from the point of pick-up to the destination. For waste shipments, the hazardous waste manifest satisfies DOT shipping paper requirements, if all DOT requirements for shipping papers are met. (49 CFR 172.205)

2. SHIPPER'S RESPONSIBILITY - (49 CFR 172.200(a)) The person offering a hazardous material for transport has the responsibility to properly prepare the shipping paper. (See also 49 CFR 73.22.)

3. GENERAL ENTRIES ON SHIPPING PAPERS - (49 CRF 172.201)

A. Contents - When describing a hazardous material on a shipping paper, that description must conform to the following requirements:

(1) When a hazardous material and other materials are both described on the same shipping paper, the hazardous material description entries:

(a) Must be entered first, or

(b) Must be entered in a contrasting color (or highlighted in a contrasting color 0 for reproduced copies of the shipping paper only), or

(c) Must be identified by the entry "X" placed before the proper shipping name in a column captioned "HM." The "X" may be replaced by "RQ" (Reportable Quantity), if appropriate. (See Figure 1 on following page.)

(2) The required shipping description on the original shipping paper and all copies must be legible and printed (manually or mechanically) in English.

(3) The required description may not contain any code or abbreviation, unless it is specifically authorized or required, such as "UN," United nations, "NA," North America, or "Ltd Qty," Limited Quantity.

(4) A shipping paper may contain additional information concerning the material provided that the information is not inconsistent with the required description. The additional information must be placed after the basic description required by 49 CFR 172.202(a)(4).

(a) When appropriate, the entries "IMO" or "IMO Class" may e entered immediately before or immediately following the class entry in the basic description.

(b) If a material meets the definition of more than one hazard class, the additional hazard class(es) may be entered after the hazard class in the basic description.

NOTE: The International Civil Aviation Organization (ICAO) issues the "Technical Instructions for the Safe Transport of Dangerous Goods by Air" for the international transportation of goods by air.

The International Maritime Organization (IMO) issues the "International Maritime Dangerous Goods Code (IMDG)" for the international transportation of hazardous materials by water.

The terms "dangerous goods" and "hazardous materials" are considered synonymous.

B. Name of Shipper - A shipping paper for a shipment by water must contain the name of the shipper.

C. Emergency Response Telephone Number - A shipping paper must contain an emergency response telephone number, as required.

4. HAZARDOUS MATERIALS DESCRIPTION - (49 CFR172.202) The shipping description of a hazardous material no a shipping paper must include the following information:

A. Proper Shipping Name - The name prescribed for material in 49 CFR 172.101 Hazardous Material Table or 172.102 optional HMT MAY NOT BE ABBREVIATED. (49 CFR 172.202(a)(1)).

B. The Hazard Class of the Material - The class prescribed for material in 49 CFR HM Table 172.101 or 172.102 Optional HMT. (See 49 CFR 172.202(a)(2)).

C. The identification Number - The number prescribed in the HM Table 172.101 or 172.102 Optional table for the material (proceeded by "UN" or "NA," as appropriate). (49 CFR 172.202(a)(3)).

D. The Total Quantity By Weight - (net or gross, as appropriate) or volume, including the unit of measure, of the hazardous material, except for empty packaging, cylinders of compressed gasses, and packaging of greater than 110 gallon capacity. (49 CFR 172.202(a)(4)).

E. Except as otherwise provided in the regulations, the basic description specified in 172.202(a)(1),(2), and (3) must be in the sequence shown. For example: "Acetone, Flammable liquid, UN 1090." (49 CFR 172.202(b)).

F. The total quantity of the material covered by one description must appear before or after (or both before and after) the basic description. (49 CFR 172.202(c)).

(1) Abbreviations may be used to specify the type of packaging and units of measure of the total quantity. For example: 10 cins. Paint, Flammable Liquid, UN 1263, 500 lbs. (49 CFR 172.202(c)(1)).

(2) Type of packaging and destination marks may be entered in any appropriate manner before or after the basic description. (49 CRF 172.202(c)(2)).

5. ADDITIONAL DESCRIPTION REQUIREMENTS (49 CFR 172.203) (ALL MODES)

A. Exemptions - Each shipping paper issued in connection with shipment made under an exemption must bear the notation "DOT-E" followed by the exemption number assigned (Example: DOT-E 46-48). Place the exemption number adjacent to the description to which the exemption applies. (49 CFR 172.203(a)).

B. Limited Quantities - Descriptions for materials offered as "Limited Quantities: must include the words "Limited Quantities" or "Ltd Qty" following the basic description. (49 CFR 172.203(b)).

C. Hazardous Substance (49 CFR 172.203(c)).

(1) If the proper shipping name (for a material that is a hazardous substance) does not identify the hazardous substance by name, the following shall be entered, in parentheses, in association with the basic description:

(a) Name of the hazardous substance from the Appendix to the 49 CFR 172.101 Hazardous materials Table, or

(b) For waste streams, the waste stream number (A "waste stream" is a hazardous waste [liquid, sludge, solid, gas] continuously generated from a manufacturing process. Such waste will be listed in either 40 CFR 261.31 or 40 CFR 261.32, and will be assigned an EPA waste stream number), or

(c) For wastes exhibiting an EPA characteristic of ignitability, corrosivity, reactivity, or EP toxicity the letters "EPA" followed by the word "ignitability," "corrosivity," "reactivity," or "EP toxicity" or the corresponding "D" number, as appropriate.

(2) The letters "RQ" (Reportable Quantity) shall be entered on the shipping paper either before or after the basic description required by 49 CFR 172.202 for each hazardous substance. (See definition in 49 CFR 171.8.)

Example: "RQ, Cresol, Corrosive Material, UN 2076"; or "Hazardous Substance, Solid, n.o.s., ORM-E, NA 9188 (Adipic Acid), RQ."

D. Radioactive Materials - for additional description requirements for radioactive materials, refer to 49 CFR 172.203(d).

GUIDE MARKINGS

USE OF GUIDE - This guide was prepared as an aid to shippers and carriers of hazardous materials. It does not contain or refer to all of the DOT requirements for markings. For specific details, refer to appropriate Section of Title 49, Code of Federal Regulations (CFR), Parts 100-199.

MARKING - means placing on the outside of a shipping container, one or more of the following: the proper shipping name, hazard class, identification number, instructions, caution, and/or weight. Marking also includes any required specification marks on the inside or outside shipping container.

DESCRIPTIVE INFORMATION

I. GENERAL REQUIREMENTS (49 CFR 172.300-172.304)

A. Unless Specifically Excepted, all packages of hazardous materials must be marked with:

1. The proper shipping name.
2. UN or NA Identification number of the contents (49 CFR 172.101 or 49 CFR 172.102, Hazardous Materials Tables.)
3. If the inhalation toxicity of any material in a package falls within the criteria specified in 49 CFR 173.3a(b)(2), the package shall be marked "Inhalation Hazard" in association with the required label(s).
4. The name and address of either the consignee or consignor.

B. All markings must be:

1. Durable and in English, printed or affixed to the surface of the package or on a label, tag or sign.
2. On a background of a sharply contrasting color, and unobscured by labels or attachments.
3. Placed away from other markings that could reduce effectiveness.

II. SPECIFIC REQUIREMENTS

A. HAZARDOUS SUBSTANCES (49 CFR 172.324)

1. For a package of 110 gallons or less that contains a hazardous substance that is not identified by the proper shipping name, one of the follo9wing must be entered, in parentheses, in association with the proper shipping name:

a. Name of the hazardous substance from Appendix to 49 CFR 172.101, or
b. For waste streams, the waste stream number or
c. For waste exhibiting an EPA characteristic of ignitability, corrosivity, reactivity, or EP toxicity, the letter EPA followed by "ignitability, ": or "corrosivity," or "reactivity," or "EP toxicity," or the corresponding "D" number, as appropriate.

2. Each package with a capacity of 110 gallons or less that contains a hazardous substance must display "RQ" in association with the proper shipping name.

B. LIQUID HAZARDOUS MATERIALS (49 CFR 172.312)

1. Must be packed with the closures of the inside packaging in the upright position.
2. Must have marking "THIS SIDE UP" or "THIS END UP" on the outside packaging.
3. Should use arrow symbol on the outside packaging to show upright orientation of packages. (See ANSI Standard MH6.11968, "Pictorial Marking for Handling Goods.")

C. CONTAINERS-OVERPACKS

1. The outside container (overpack) must be marked in accordance with 49 CFR 173.25.

D. CONTAINERS-CYLINDERS

1. All cylinders must be marked in accordance with 49 CFR 173.34 and 49 CFR 173.301 through 173.306.
2. Reinspected and Retested Cylinders must be marked in accordance with 49 CFR 173.34(e)(6).

III. TANKS

A. PORTABLE TANKS (49 CFR 172.326 AND 49 CFR 72.332) - Portable tanks must be marked with:

1. Proper shipping name - in letters at least 2 inches high and on two opposite sides.
2. Identification number - UN or NA (United Nation or North America) identification number on: TWO OPPOSITE SIDES (near proper shipping name) on tanks of less than 1,000gallons capacity; on EACH SIDE AND EACH END on tanks of more than 1, 000 gallon capacity.
3. Name of owner or lessee.
4. All inlets and outlets (except safety relief valves) when carrying compressed gasses (DOT-51).
5. Whether or not the inlets and outlets communicate with vapor or liquid (49 CFR 178.245-6b)).

B. CARGO TANKS - HIGHWAY (49 CFR 172.328) - Cargo tanks must be marked with:

1. Identification number - (49 CFR 172.101)
2. In addition to identification numbers, cargo tanks transporting compressed gasses must be marked with:
   a. Proper shipping name or appropriate common name such as "Refrigerant Gas." Letters must be at least 2 inches high on each end and each side. (49 CFR 172.101, 172.102, and 172.328(c)(1)(2)).
   b. Inlets and outlets (except safety relief valves) shall be marked to designate whether the inlets and outlets communicate with vapor or liquid, when the tank is filled to its maximum permitted filling density. (49 CFR 178.337-9 for DOT MC 331 tanks)

NOTE: when ID numbers are displayed on placards, orange panels are not required. When ID numbers are displayed on orange panels, or white square-on-point display configurations, appropriate placards are ALSO RQUIRED. For materials in hazard classes for which placards are specified and identification numbers are required, but for which ID numbers may not be displayed on the placards required for the material (49 CFR 172.334(a)), ID numbers must be displayed on orange panels or on plain white square-

on-point display configuration in association with the placard. ID numbers on white square-on-point display configuration are considered markings and the display is not a placard. (49 CFR 172.332, 172.334, 172.336)

c. TANKS CARS (49 CFR 172.330) - Certain cars are required to be marked on each side and each end (49 CFR 172.332 and Parts 173 and 179 for specific details.) IF required to be marked, they must include:

1. Proper shipping name or appropriate common name in letters at least 4 inches high with at least a 5/8" stroke.
2. Identification numbers - Display the appropriate number(s) (49 CFR 172.101) on placards, orange panels or white square-on-point display configurations.
3. The accurate name of the contents contained in the tank.

Note: For requirements for multi-unit tank car tanks, see 49 CFR 172.330(d)-(f).

IV. BULK PACKAGING - (other than portable tanks, cars and multi-unit tank car tank) (49 cfr 172.331

A. Includes packages meeting the following criteria: (see 49 CFR 171.8)

1. Internal volume greater than 118.9 gallons (450 Liters) for liquids, or
2. A capacity greater than 8818.8 pounds (400 kilograms) for solids, or
3. A water capacity greater tan 1000 pounds (453.6 kilograms) for a gas as defined in 49 CFR 173.300.

B. Mark packages as prescribed in 49 CFR 172.332 or 172.336(b), as appropriate with the identification number specified in 172.101 when authorized:

1. On two opposite sides for packages of 1000 gallons (3785.4 liters or 133.7 cubic feet) or less capacity.
2. On each side and end for packages greater than 1000 gallons (3785.4 liters or 133.7 cubic feet) capacity. Identification numbers shall be displayed on orange panels or specified placards, or when appropriate, on white square-on-point display configurations having the same outside dimensions as a placard.

V. RADIOACTIVE MATERIALS - (49 CFR 172.310) - In addition to any other marking required by Subpart D of 49 CFR 172 (Marking), each package must be marked as follows:

A. Gross weight must be marked on containers weighing over 110 pounds.
B. "TYPE A" or "TYPE B" (as appropriate) in letters at least 1/2 inch high.
C. "USA," must follow the specification markings or package certification on export shipments.

VI. OTHER REGULATED MATERIALS (ORM) (49 CFR 172.316)

A. Place the appropriate ORM designation immediately following or below the proper shipping name on at least on side or end of the package.
B. Marking must be within a rectangular border - approximately 1/4 inch in size on each side of "ORM___" (ORM designation).

NOTE: By these markings, the shipper certifies that the material is properly described, classed, packaged, marked, labeled, and in proper condition for transportation. The shipper's certification is still required on the shipping paper (' 172.204). When ID numbers are required, they must be

displayed on either orange panels (' 172.332)(b)) or on a plain white square-on-point configuration having the same dimensions as a placard.

OTHER MARKING REQUIREMENTS

I. REQUALIFIED CONTAINERS - DRUMS - (marked by reconditioner). Some steel containers in the DOT Series (DOT 17C, 17E, and 17H) may be qualified for reuse by a DOT-registered reconditioner of drums. The drums are stripped of labels, exemption numbers, and other markings. They are reconditioned to meet 49 CFR 173.28(m) and marked with the appropriate assigned registration numbers.

II. CYLINDERS & TANKS - (marked with inspection and/or retest date). Reusable cylinders, portable tanks, cargo tanks and tank cars must be either visually inspected or retested at periodic intervals. The date of requalification must e on the container. (See 49 CFR 173.24, 173.31, 173.32, 173.33, and 173.34.)

III. CARGO HEATERS - Cargo heaters authorized for use with flammable liquid or gas must be marked in accordance with 49 CFR 177.834 (I)(1)(2)(E) and (F).

IV. MOTOR VEHICLES - A carrier may not move a transport vehicle containing hazardous material unless the vehicle is marked in accordance with Part 172 or unless and emergency exists. (See 49 CRF 177.823.)

OTHER MARKING REQUIREMENTS

I. GENERAL - Specification containers must be marked with DOT specification numbers under which the containers are made (49 CFR Parts 178 and 179). The manufacturer's name and address or symbol must be registered with the Associate administrator for Hazardous Materials Safety. Duplicate symbols are not authorized.

II. MARKINGS - All containers must comply with the markings requirements of 49 CFR 173.24, Parts 178 and 179. Exceptions for Canadian and other Import/export situations are found in 49 CFR 171.12 and 171.12(a).

NOTE: For certain containers, specific detailed information (such as original test date information and type of material) are required. (See Parts 178 and 179.) As a final check before offering a shipment for transportation, visually inspect the shipment.

This handout does not contain all the marking requirements. It is designed as a guide only. For details on markings, consult the Code of Federal Regulations, Title 49, Parts 100-199.

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GUIDE FOR HAZARDOUS MATERIALS SHIPPERS

USE OF GUIDE - This guide is presented as an aid to shippers of hazardous materials. It does not contain or refer to all of the DOT requirements for shipping hazardous materials. For specific details, refer to all of the DOT requirements for shipping hazardous materials. For specific details, refer to the Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-199.

The Following is offered as a step-by-step procedure to aid in compliance with the applicable DOT Regulations.

STEP 1 - DETERMINE THE PROPER SHIPPING NANE - The shipper must determine the proper shipping name of the materials as listed in the Hazardous Materials Table, 49 CFR 172.101, Column (2).

STEP 2 - DETERMINE THE HAZARD CLASS OR CLASSES

A. Refer to the Table, 49 CFR 172.101, Column (3) and locate the hazard class of the material.
B. If more than one class is shown for the proper shipping name, determine the proper class by definition.
C. If the materials have more than one hazard, classify the material based on the order of hazards in 49 CFR 173.2.

STEP 3 - SELECT THE PROPER IDENTIFICATION NUMBERS

A. Refer to the Table, 49 CFR 172.101, Column (3a) and select the Identification Number (ID) that corresponds to the proper shipping name and hazard class.
B. Enter the ID number(s) on the shipping papers and display them, as required, on packagings, placards and/or orange panels.

STEP 4 - DETERMINE THE MODE(S) OF TRANSPORT TO ULTIMATE DESTINATION

A. As a shipper, you must assure yourself that the shipment complies with various modal requirements.
B. The modal requirements may affect the following: (1) Packaging; (2) Quantity per Package; (3) Marking; (4) Labeling; (5) Shipping papers; (6) Certification.

STEP 5 - SELECT THE PROPER LABEL(S) AND APPLY AS REQUIRED

A. Refer to the Table, 49 CFR 172.101, Column (4) for required labels.
B. For details on labeling refer to; (1) Additional Labels, 49 CFR 172.402; (2) Placement of Labels 49 CFR 172.406; (3) packaging (Mixed or Consolidated), 49 CFR 172.404(a) and (b); (4) Packages Containing Samples, 49 CFR 172.402(h); (5) Radioactive Materials, 49 CFR 172.403; and, (6) Authorized Label Modifications, 49 CFR 172.405.

STEP 6 - DETERMINE AND SELECT THE PROPER PACKAGES

A. Refer to the Table, 49 CFR 172.101, Column 5(a) for exceptions and Column (5b) for specification packagings. Consider the following when selecting an authorized package: Quantity per package; Cushioning material, if required; Proper closure and reinforcement; Proper pressure; Outage; etc. as required.
B. If packaged by a prior shipper, make sure the packaging is correct and in proper condition for transportation.

STEP 7 - MARK THE PACKAGING (INCLUDING OVERPACKS)

A. Apply the required markings (49 CFR 172.300); Proper shipping name and ID number, when required (49 CFR 172.301); Name and address of Consignee or Consignor (49 CFR 172.306).
B. For details and other required markings, see 49 CFR 172.300 through 172.338.

STEP 8 - PREPARE THE SHIPPING PAPERS

A. The basic requirements for preparing shipping papers include: Proper Shipping name; hazard class; ID number; Total quantity; Shipper's certification; and emergency response telephone number.
B. Make all entries on the shipping papers using the information required and in proper sequence (49 CFR 172.202).
C. For additional requirements, see 49 CFR 172.200 through 172.205.

STEP 9 - CERTIFICATION

A. Each shipper must certify by printing (manually or mechanically) on the shipping papers that the materials being offered for shipment are properly classified, described, packaged, marked and labeled, and in proper condition for transportation according to the applicable DOT Regulations (49 CFR 172.204).
B. For surface shipments; see 49 CFR 172.204(a) and (b); for air shipments, see 49 CFR 172.204(c).

STEP 10 - LOADING, BLOCKING ND BRACING - When loading hazardous materials into the transport vehicle or freight container, each package must be loaded, blocked and braced in accordance with the requirements for mode of transport.

A. If the shipper loads the freight container or transport vehicle, the shipper is responsible for the proper loading, blocking, and bracing of the materials.
B. If the carrier does the loading, the carrier is responsible.

STEP 11 - DETERMINE THE PROPER PLACARD(S) - Each person who offers hazardous materials for transportation must determine that the placarding requirements have been met.

A. For Highway, unless the vehicle is already correctly placarded, the shipper must provide the required placard(s) and required ID number(s) (49 CFR 172.506).
B. For Rail, if loaded by the shipper, the shipper must placard the rail car if placards are required. (49 CFR 172.508)
C. For Air and Water shipments, the shipper has the responsibility to apply the proper placards.

STEP 12 - HAZARDOUS WASTE/HAZARDOUS SUBSTANCE

A. If the material is classed as a hazardous waste or hazardous substance, most of the above steps will be applicable.

B. Pertinent Environmental Protection Agency Regulations are found in the Code of Federal Regulations, Title 40, Part 262.

AS A FINAL CHECK AND BEFORE OFFERING THE SHIPMENT FOR TRANPORTATION, VISUALLY INSPECT YOUR SHIPMENT. THE SHIPPER SHOULD ENSURE THAT EMERGENCY RESPONSE INFORMATION IS ON THE VEHICLE FOR TRANSPORTATION OF HAZARDOUS MATERIALS.

Revised: February 1991

GUIDE FOR HAZARDOUS MATERIALS CARRIERS

USE OF GUIDE - This guide was prepared as an aid to carriers of hazardous materials. It does not contain or refer to all of the DOT requirements for transporting hazardous materials. For specific details, refer to the Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-199.

Basically, all "for hire" carriers and all "private carriers: are subject to the same or at least ver y similar DOT hazardous materials regulations.

Containerization and other modern freight handling procedures frequently prevent initial carriers from making physical inspections of the freight. It is more difficult for interline (secondary) carriers to determine the physical condition of freight or regulatory compliance. Carriers, therefore, must frequently accept the word of shippers as to the suitability of the package and the accuracy of the material description. Therefore, it is very important to carefully review the shipping documents including the shippers' certification. Always visually inspect the transport vehicle or freight container for leaks or potential problems.

Careful attention to the following subject areas will aid in complying with the "Carrier Regulations":

I. DETERMINE EMPLOYEE QUALIFICATIONS

"It is the duty of each motor carrier to comply with the prescribed regulations and to thoroughly instruct employees in relation thereto." [Refer to CFR, Title 49 '174.7 (Rail); '175.20 (Air); '176.13 (Water); and '177.800(b) (Highway)].

A. Identify all personnel who have hazardous materials transportation responsibilities.
B. Determine what additional instruction or training each needs (if any).
C. Assure that those needing instruction receive the instruction.
D. Maintain records of training.
E. Periodically review training needs and maintain the required expertise.

II. DETERMINE CONDITION OF TRANSPORT VEHICLE

A. Make certain that the cargo space is suitable for loading. It should be free of nails and other protruding sharp objects.
B. Make certain that the vehicle is suitable for the material to be loaded. It must be in compliance with applicable carrier safety and hazardous materials regulations, as well.

III. MAY THE SHIPMENT BE ACCEPTABLE FOR TRANSPORT?

"No person may accept for transportation any shipment of hazardous material that is not in accordance with Parts 171, 172, and 173." [Refer to CFR, Title 49, '174.3 (Rail); '175.3 (Air); '176.3 (Water); '177.801 (Highway)].

To comply with this provision, a carrier must:

A. Determine that the shipping papers are prepared in proper format and are accurate and complete. At minimum, they must include the proper shipping name, hazard class, ID number,

quantity, emergency response telephone number, and consignee (or consignor) name and address.

B. Obtain a proper shipper's certificate (unless excepted).
C. Determine that proper placard(s) and ID number(s) are displayed, when required.
D. Determine that emergency response information is on the vehicle.

When practical, a carrier should also determine that:

A. Authorized packaging are used and that they are in proper condition for transportation.
B. Each package is properly marked and labeled, when required.
C. The freight is adequately blocked and braced to prevent movement and/or damage in transit.

IV. IS THE SHIPMENT TO BE INTERLINED?

A. Properly prepare the material so that the secondary carrier will accept it from you. This is particularly important for intermodal and international shipments.
B. Modal requirements may affect the following: (1) Packaging; (2) Quantity per package; (3) Marking; (4) labeling; (5) shipping papers; (6) Certification.

V. CARRIER LOADED FREIGHT

When the carrier loads the transport vehicle, make certain that:

A. Documentation matches the freight.
B. Materials are loaded in accordance with 49 CFR 177.848.
C. Poisons are not loaded with foodstuff (unless excepted).
D. Damaged or leaking packages are not loaded.
E. Freight is properly blocked and braced to prevent damage in transit.
F. Proper placards and ID numbers are displayed, when required.
G. Required documentation is furnished by the driver/pilot/conductor/captain.

VI. HAZARDOUS WASTE/HAZARDOUS SUBSTANCE

A. When the material is classified as a hazardous waste or hazardous substance, there are additional registration, identification, and documentation regulations as stated in 49 CFR 172.205 and 172.324.
B. Pertinent Environmental Protection Agency Regulations are found in the Code of Federal Regulations, Title 40, Part 262.

VII. INCIDENT REPORTS

The carrier who transports hazardous materials (including hazardous waste and hazardous substances) is responsible for reporting requirements. Most incidents involving unintentional releases of hazardous materials in transportation must be reported to DOT. Detailed criteria concerning telephonic and/or written reports are published in CFR, Title 49, Sections 171.15 and 171.16.

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INDICATORS OF HAZARDOUS MATERIALS SHIPMENT VIOLIATIONS

The enforcer, shipper, container manufacturer, or carrier may use this partial listing of item as to spot check for compliance with the DOT Hazardous Materials Regulations. Included in this listing are indicators only and not necessarily violations in and of themselves.

The hazardous materials regulations for shippers are found in the Code of Federal Regulations, Title 49, Parts 171, 172, 173, 178, 179 and 180. These Parts of 49 CFR contain general requirements and communication regulations. This list may be used as a guide when looking for discrepancies or making a compliance inspection. Areas to consider include, but are not limited to: classification, packaging, marking, labeling, placarding, loading, blocking and documentation. When using this information, remember it is designed to be used as a guide only and does not cover all aspects of the regulations.

I. PROPER SHIPPING NAME AND HAZARD CLASS

A. Inaccurate designation of hazard class.
B. Failure to properly classify material having more than one hazard. (49 CFR 173.2)
C. Inaccurate description and/or proper shipping name for material being shipped (49 CFR 172.101 and 172.102)
D. Omission of technical name or names of material following n.o.s. description of material. CFR (49 CFR 172.203(k))
E. When required, the letters "RQ" not displayed in association with the proper shipping name. (49 CFR 172.203©(2))
F. Missing emergency response information and telephone number.

II. PACKAGING (CONTAINERS IN GENERAL)

A. Use of DOT specification packages not authorized for the material being shipped.
B. Use of containers that are leaking. (49 CFR 173.24)
C. Manufacturing and marking containers as meeting a DOT specification when they do not meet the specification.
D. Packaging exceeding maximum quantity limitations for materials.
E. Packages improperly marked.
F. Offering for shipment improperly packaged material.
G. Consignee or consignor's name marking omitted from packaging. (49 CFR 172.306)
H. Identification numbers omitted on packaging. (49 CFR 172.301)

III. CONTAINERS (MISCELLANEOUS)

A. STEEL

1. Labeled containers with no DOT specification markings. (Commonly found violations are 5 gallon 29 gauge metal pails and 5 gallon rectangular cans).
2. Packages of hazardous materials with temporary repairs (e.g. damaged, sealed with tape, putty, chewing gum, or screws).
3. Labeled containers in improper condition, i.e., dented, rusted or corroded. (NOTE: some of these are judgmental decisions).
4. Specification marking is illegible on labeled containers.

5. Labeled reused containers marked "NRC" (look for old date of manufacturer, dents, rust, and paint layers).
6. Labeled reused containers marked "STC" and/or 17C, 17E, and 17H with no reconditioner's marking.
7. Labeled reused containers with a reconditioner's marking that is not a DOT 17C, 17E, or 17H container.
8. Labeled 55 gallon open-head drums with 2 rolling hoops and/or less than 5/8 inch ring bolt, non-drop forged ring lugs, and/or "lever lock" ring closures.) Good possibility of non-DOT specification).
9. Imported drums marked as meeting the DOT Hazardous Materials Regulations.

B. FIBERBOARD BOXES

1. Boxes with no DOT specification marking, for example, when inside packagings are larger than the "limited quantity" exception for the commodity and specification packaging is required.
2. Boxes marked with DOT specification marking which are poorly constructed (i.e., gaps, uneven closures, seams and joint separation).
3. If inner flaps do not meet, are fill-in-pieces used to fill void?
4. Boxes damaged by water.
5. Improperly closed boxes (look for masking tape, cellophane tape, and string).
6. Non-DOT specification fiberboard box used in lieu of specification container, when required.

C. POLYETHYLENE PACKAGINGS

1. Open-head polyethylene packagings used for materials not authorized to e in them.
2. Illegible marked packagings.
3. Leaking containers offered for transportation.
4. When poison is shipped, is the container marked "POISON"?

D. FIBER DRUMS

1. Non-DOT specification fiber drums.
2. Fiber drums constructed of materials weaker than required by the specification.
3. Use of fiber drums marked DOT-21P without inside polyethylene liner.
4. Using fiber drums marked "STC" more than once for shipping hazardous materials.
5. Damaged fiber drums.
6. Improper markings on containers for the commodity being shipped.

E. CYLINDERS

1. Reuse of single-use cylinders such as DOT Specification 39.
2. Cylinders in use beyond test date.
3. Cylinders in improper condition:
   a. No valve protection
   b. Bulge in side
   c. Dented or corroded
   d. Defective valve
4. Cylinders refilled by other than the owner of the cylinder and without the permission of the owner.
5. Cylinders improperly marked, e.g. duplication of serial numbers.
6. Cylinders offered for transportation without proper identification of contents.
7. Identification symbols not registered with the Department of Transportation.
8. Illegible cylinder markings.

F. PORTABLE TANKS

1. Name of owners of lessee omitted on tank.
2. No labels and/or placards displayed on tank containing hazardous materials.
3. No identification number displayed on the placards or on any orange panel. (' 172.326)

G. CARGO TANKS (QUALIFICATION AND MAINTENANCE) (49 CFR 180.401-417)

1. Using a cargo tank without proper identification of contents.
2. Improperly marked, e.g. size of marking or not marked in contrasting color.
3. Omission of the marking "QT" (Quenched and Tempered Steel or NQT" (other than Quenched and Tempered Steel), when required on cargo tanks. (49 CFR 172.328(d) and 173.315)
4. Omission of identification number on placard or orange panel.
5. Test Date Markings missing or out-of-date.

IV. MARKING OF CONTAINERS (49 CFR 172.300-172.338)

A. No proper shipping name and/or ID number on the container. (49 CFR 172.301)
B. No name and address of consignee or consignor on the container. (49 CFR 172.306)
C. No DOT Exemption number on containers shipped under DOT Exemptions. (49 CFR 173.22(a)(1)(iv))
D. Container marking not in a contrasting color. (49 CFR 172.304)
E. Gross weight not marked on radioactive materials packages weighing over 110 pounds. (49 CFR 172.301)
F. Container of liquid hazardous material not marked on outside "THIE END UP" or "THIS SIDE UP." (49 CFR 172.312)
G. Reconditioned drums improperly marked. (49 CFR 173.28)
H. USA not included as part of the DOT Specification markings for radioactive materials packages destined for export. (49 CFR 172.310)
I. Portable tanks not marked with proper name of the hazardous material. (49 CFR 172.326)
J. Omission of marking of INHALATION HAZARD, when required. (49 CFR 175.301)
K. Omission of marking of INHALTION HAZARD, when required. (49 CFR 172.301)

V. LABELING (49 CFR 172.400-172.450)

A. No labels on outer container to represent mixed packaging of hazardous materials. (49 CFR 172.404)
B. Label on the container not consistent with the hazard class on the shipping paper.
C. Use of obsolete labels. (49 CFR 172.407)
D. Color and/or size of label does not meet standard. (49 CFR 172.407)
E. No label on shipments destined for air transport. (49 CFR 172.402)
F. Labeling containers not authorized to be labeled. (49 CFR 172.400)
G. No label on "LIMITED QNATITIES" offered for air transportation. (See appropriate section 49 CFR Park 173.)